Report to the Joint Standing Committee on Environment and Natural Resources
126th Legislature, Second Session

Maine Materials Management Plan

2014 State Waste Management and Recycling Plan Update
&
2012 Waste Generation and Disposal Capacity Report

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I. Executive Summary

This update to the Maine Solid Waste Management and Recycling Plan is undertaken every five years, in accordance with 38 MRSA §2122 and must provide guidance and direction to municipalities in planning and implementing waste management and recycling programs at the state, regional and local levels. In addition, the Plan is to incorporate changes in waste generation trends, changes in waste recycling and disposal technologies, development of new waste generating activities and other factors affecting solid waste management as the Department finds appropriate. This Plan update also includes the 2012 Waste Generation and Disposal Capacity Report, which is the source for much of the current data referred to within the Plan.

The Department views this Plan as the opportunity to provide information to municipalities and other solid waste managers on current efforts and other activities supporting the state's solid waste management hierarchy. This includes information on reduction, recycling, beneficial use, and conversion technologies, as well as the cost of solid waste services.

An Advisory Committee, made up of public, private and non-profit solid waste program and policy managers, was convened by the Department to assist in this Plan's development and content. The committee members received background documents on various topics and participated in two meetings. A listing of the Advisory Committee members may be found in Appendix A. The Department thanks the members for their participation and input to this Plan's update.

Priorities determined by the Department, with assistance from the Advisory Committee, are detailed in the Plan. Some of the priorities are unchanged from past plans, e.g., 'increase amount of materials recycled' and 'increase collection and use of organic residuals'. There are also several new priorities, reflecting changing technologies and options now available to municipalities and businesses, including 'conversion technologies'.

The Plan includes strategies and actions for the Department and solid waste management entities to be accomplished in the next five years, including short-term changes and groundwork for longer-term opportunities with capital investments that may require a longer period for return on investment.

II. Vision and Purpose

The 2014 Maine Materials Management Plan includes strategies and actions to foster a continued shift toward a holistic system of materials management in Maine. Such an approach takes a broad view, and addresses the management of materials and products through their complete lifecycles, rather than focusing solely on management at the end of life (e.g. disposal). The materials management approach recognizes the full range of opportunities that exist throughout these lifecycles, from product design and manufacturing to reuse and recycling, in order to conserve resources, foster sustainability and minimize environmental impacts.

This Plan is based on the priorities of Maine's Solid Waste Management Hierarchy (38 MRS §2101(1)) and furthers the hierarchy's policy to "*plan for and implement an integrated approach to solid waste management for solid waste generated in this State and solid waste imported into this State . . .*" The Plan includes strategies to enhance the State's waste reduction and diversion efforts, consistent with policy articulated in Maine law (38 MRS §2101(2)). The Plan builds upon the 2009 Maine Waste Management and Recycling Plan and the successes that have been achieved in such areas as recycling, beneficial use, toxics reduction and extended producer responsibility.

The Department envisions continuing: movement toward comprehensive sustainable materials management in Maine, focus on adherence to the principles of the Solid Waste Management Hierarchy in the development and implementation of programs and waste management systems, and expansion of waste reduction and diversion efforts.

The purpose of the 2014 Maine Materials Management Plan is to provide information, guidance and direction to municipalities, regions, businesses and others, regarding the status, development and implementation of sustainable materials management and waste management programs at the state, regional and local levels. The Plan identifies state priorities and establishes an action plan for the next 5 years, including strategies and actions through which the state can support the materials management, waste diversion, and recycling efforts of municipalities, regions and businesses. Maine statute (38 MRS §2122) provides that:

"The department shall prepare an analysis of, and a plan for, the management, reduction and recycling of solid waste for the State. The plan must be based on the priorities and recycling goals established in sections 2101 and 2132. The plan must provide guidance and direction to municipalities in planning and implementing waste management and recycling programs at the state, regional and local levels."

Specifically, the statute (38 MRS §2123-A) requires that the following elements be part of the plan:

> *"1. **Waste characterization**. The state plan must be based on a comprehensive analysis of solid waste generated, recycled and disposed of in the State. Data collected must include, but not be limited to, the source, type and amount of waste currently generated; and the costs and types of waste management employed including recycling, composting, landspreading, incineration or landfilling.*
> *2. **Waste reduction and recycling assessment**. The state plan must include an assessment of the extent to which waste generation could be reduced at the source and the extent to which recycling can be increased.*

*3. **Determination of existing and potential disposal capacity**. The state plan must identify existing solid waste disposal and management capacity within the State and the potential for expansion of that capacity.*

*4. **Projected demand for capacity**. The state plan must identify the need in the State for current and future solid waste disposal capacity by type of solid waste, including identification of need over the next 5-year, 10-year and 20-year periods."*

The law provides that the analysis is to be revised by January 1, 2014 and every 5 years thereafter, to incorporate changes in waste generation trends, changes in waste recycling and disposal technologies, development of new waste generating activities and other factors affecting solid waste management as the department finds appropriate.

The plan is based on the priorities and policies of the Solid Waste Management Hierarchy found at 38 MRS §2101:

*"**Priorities**. It is the policy of the State to plan for and implement an integrated approach to solid waste management for solid waste generated in this State and solid waste imported into this State, which must be based on the following order of priority:*

A. Reduction of waste generated at the source, including both amount and toxicity of the waste;
B. Reuse of waste;
C. Recycling of waste;
D. Composting of biodegradable waste;
E. Waste processing that reduces the volume of waste needing land disposal, including incineration; and
F. Land disposal of waste.

It is the policy of the State to use the order of priority in this subsection as a guiding principle in making decisions related to solid waste management.

***Waste reduction and diversion.** It is the policy of the state to actively promote and encourage waste reduction measures from all sources and maximize waste diversion efforts by encouraging new and expanded uses of solid waste generated in this State as a resource."*

The Plan is also based upon the State recycling and waste reduction goals found at 38 MRS §2132:

*"**State recycling goal.** It is the goal of the State to recycle or compost, by January 1, 2014, 50% of the municipal solid waste tonnage generated each year within the State.*

***State waste reduction goal**. It is the goal of the State to reduce the biennial generation of municipal solid waste tonnage by 5% beginning on January 1, 2009 and by an additional 5% every subsequent 2 years. This reduction in solid waste tonnage, after January 1, 2009, is a biennial goal. The baseline for calculating this reduction is the 2003 solid waste generation data gathered by the former State Planning Office."*

Although the State's recycling and waste reduction goals are specific to the municipal solid waste (MSW) portion of Maine's solid waste stream, the Plan includes information on the recycling and beneficial uses of construction & demolition debris (CDD) and other solid wastes such as industrial wastes.

In addition to revising the State's Solid Waste Management and Recycling Plan every five years, the Department is also charged with preparing the Solid Waste Generation and Disposal Capacity Report for the Legislature annually (38 MRS §2124-A). This report provides information on the statewide generation of solid waste, recycling rates and solid waste disposal capacity, and an analysis of the relationship between available disposal capacity and disposal prices. This year, the plan and the report have been combined into this single document.

III. Solid Waste Generation and Characterization

Solid waste is commonly categorized based on the type and source of the waste. Municipal solid waste (MSW) is waste that is typically generated by households and commercial businesses. The industrial sector also generates significant amounts of solid wastes that are regulated as "special waste" under Maine law because they have chemical or physical properties that make them difficult to handle or potentially pose a threat to public health, safety or the environment. (See Appendix B for statutory and regulatory definitions.)

Maine's solid waste management infrastructure includes municipal, commercial, and private industrial waste handling facilities. Once collected, solid waste in Maine is stored, transported, recycled, processed, beneficially used in place of virgin materials and as fuel, composted, digested, incinerated, and/or landfilled. Table 1 presents a summary of the types and amounts of solid waste generated in Maine in 2012.

Table 1 - 2012 Maine Solid Waste Types and Amounts

Waste type	2012 amount generated (tons)
Municipal Solid Waste (MSW)	1,307,787
Construction & Demolition Debris (CDD)/wood waste/landclearing debris	438,133
Special wastes (see Table 4 for break out by waste types and amounts)	828,184
Total Maine Generated Solid Waste 2012	**2,574,104**

In 2011, the University of Maine undertook a study to understand the types of solid waste Maine residents are disposing of in the mixed MSW stream. Figures 1 and 2 are reproduced from that report[1] to show the percentages of MSW by material type that currently is disposed of in Maine.

[1] *2011 Maine Residential Waste Characterization Study – School of Economics Staff Paper #601*; Criner, George K. and Blackmer, Travis L., University of Maine; http://umaine.edu/wcs/files/2012/02/2011-Maine-Residential-Waste-Characterization-Study1.pdf

Figure 1 - Composition of Disposed MSW

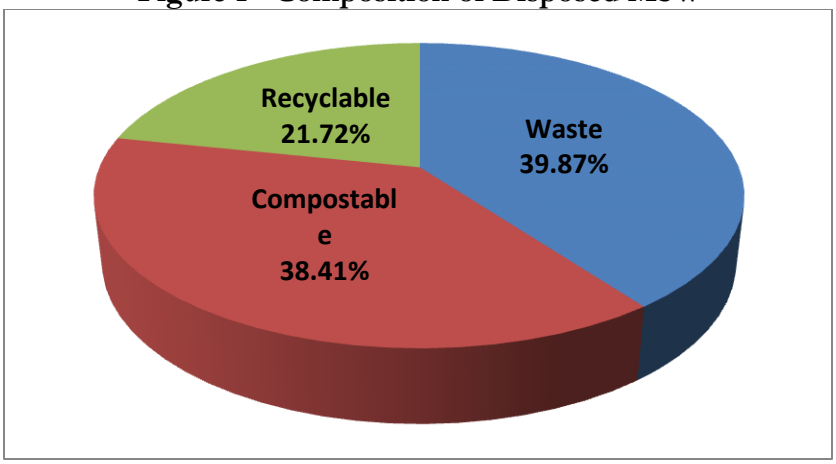
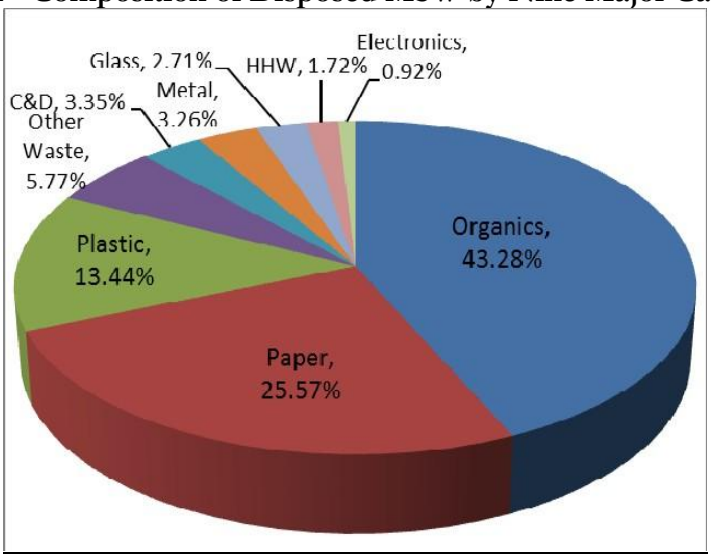


Figure 2 - Composition of Disposed MSW by Nine Major Categories



Understanding the composition of the MSW currently being landfilled or incinerated is critical to identifying the greatest opportunities for reducing MSW generation and increasing Maine's MSW recycling rate. The *2011 Maine Residential Waste Characterization Study* documented organics, paper and plastics as the three largest components in MSW disposed of from Maine. **Diversion of organics from disposal remains the largest opportunity to reduce Maine's waste stream**.

IV. Managing Maine's Solid Waste – Progress toward State Goals

In keeping with the Solid Waste Management Hierarchy (38 MRS §2101), there are a variety of options employed for managing Maine's solid waste. Appendix C is a table that provides an overview of management options currently employed for the various components of Maine's solid waste stream. This table provides a qualitative assessment of the comparative use of the management options. The options are grouped by levels on the Hierarchy, with those listed to the left preferable to those toward the right due to the resulting preservation and use of materials. By

examining Maine's waste stream by material type and current management options, we can identify opportunities for "moving up the hierarchy", decreasing disposal and increasing waste reduction, reuse, recycling and beneficial use.

A. Maine's Municipal Solid Waste Reduction Goal

Maine's statutory goals for waste reduction focus specifically on MSW. 38 MRS §2132(1-A) sets a State goal of reducing the biennial generation of municipal solid waste tonnage by 5% beginning on January 1, 2009, and by an additional 5% every subsequent 2 years. As Maine's recycling rate has held steady over the past several years, the State has experienced a reduction in the generation of MSW as reflected in the amounts of MSW disposed of in landfills and waste-to-energy incinerators. While historically there has been a positive correlation of MSW generation with activity in the overall economy, additional factors such as manufacturers' corporate sustainability initiatives that decrease the amount of packaging associated with consumer goods may be having an increasing impact.

In 2012, Maine residents generated and disposed of 0.537 tons (1,074 pounds) of MSW per person. Regional comparisons for 2010 show Mainers generated less MSW per person than any other New England state.

Table 2 - Per Capita MSW Disposal Rates – New England States 2010

State	Tons MSW Disposed 2010	2010 population	Tons per person
Maine	751,270	1,328,361	0.566
New Hampshire	748,028	1,316,470	0.568
Connecticut	2,371,767	3,574,097	0.664
Vermont	449,661	625,741	0.719
Massachusetts	4,830,756	6,547,629	0.738
Rhode Island	1,031,080	1,052,567	0.980

Municipal Solid Waste (MSW) Interstate Flow in 2010, January 30, 2013, Northeast Waste Management Association (www.newmoa.org)

The Department has been working with the Northeast Waste Management Officials' Association (NEWMOA) to quantify and track the interstate flow of MSW destined for disposal since 1999. The data collected show that the amount of MSW (exclusive of CDD and WTE ash) disposed of by Maine residents (both in-state and exported) decreased from 755,086 tons in 2008 to 713,713 tons in 2012. **This is a 5.5% decrease in disposal of MSW in 4 years**.

B. Maine's Municipal Solid Waste Recycling Rate

In 1989, the Maine Legislature enacted 38 MRS §2132, establishing a goal to recycle or compost 50% of the state's municipal solid waste annually. The legislated date to achieve the goal was revised in 2012 and extended to January 1, 2014. Individual municipal and regional recycling programs are not required to achieve a 50% recycling rate, but they are required to demonstrate progress towards the goal. The State remains committed to reaching the 50% goal in light of the value of reducing overall solid waste management costs, the positive impact on the environment, and a lessening of the need for additional solid waste disposal capacity.

The MSW recycling rate is calculated by dividing the total amount of MSW recycled by the total amount of reported in-state generated MSW in accordance with 38 MRS §2132 (3). The term "municipal solid waste" is not defined in Maine law, but has historically been interpreted as solid waste normally managed by municipalities in Maine, including CDD. However, other states and the U.S. Environmental Protection Agency (US EPA) exclude CDD from their calculations of MSW recycling rates. This creates inconsistencies when trying to compare Maine's calculated MSW recycling rate with the MSW recycling rates of other states. To address this, the Department has calculated the recycling rate for MSW as defined by EPA, and a separate recycling rate that includes CDD. This approach allows Maine to perform an apples-to-apples comparison with other states' MSW recycling rates, while also enabling Maine to evaluate where further efforts are needed to improve diversion of the broader spectrum of disposed materials handled by municipalities in Maine.

To determine the amount of material recycled in all years prior to this one, the State Planning Office and the Department utilized the annual municipal solid waste program reports submitted by communities, along with voluntarily reported data from commercial processors and materials brokers to determine MSW recycling from the commercial sector. However, this calculation was not a precise measurement as the data sets were incomplete. Many municipal reports had incomplete or inaccurately-reported data, and the agencies were unable to obtain data from all the commercial processors and materials brokers. This calculated recycling rate also reflects only recorded and reported information, and does not include volumes diverted by activities such as backyard composting, reuse from donations and used goods sales, and other unregulated strategies.

This year the Department engaged in a concerted effort to request recycling data from all commercial processors and materials brokers known to be operating in Maine to better understand the extent of the deficiencies in reporting on recyclables. Almost all of the processors and brokers were able to provide the Department with the amounts by material types and destinations for the materials they managed. This enabled the Department to eliminate any duplicative data (created when a commodity material was handled by multiple processors/brokers), and to check the data reported by municipalities in comparison to the data on municipal recycling reported by the materials processors and brokers.

The results of this effort confirmed that the reported data used to calculate Maine's MSW recycling rate has been incomplete in recent years. This is due to two factors: 1) many of Maine's municipalities do not have the resources needed to ensure complete and accurate reporting on municipal and commercial recycling within their borders in conformance with 38

MRS §2133 (7); and 2) materials processors and brokers of recyclables are not required to report on their activities in Maine.

Based on the data collected in previous years, Maine's recycling rate has remained fairly steady for the past ten years, ranging from a low of 34.8% in 2007 to a high of 39.6% in 2011. However, because deficiencies have been identified in the most recent data reported by municipalities, the Department has calculated the 2012 recycling rate by utilizing the more complete data voluntarily reported by materials processors and brokers. In addition to the 554,225 tons reported as recycled or composted, the Department estimates the non-reporting processors and brokers handled up to 5,000 tons of recyclable materials.

Table 3 - 2012 Maine's MSW Recycling Rate Calculation

	Tons
MSW landfilled in state	237,543
MSW disposed of through incineration in state (amount in minus amount WTE ash)	354,957
MSW incinerator ash landfilled in state	121,213
MSW disposed of out-of-state	39,849
Subtotal Maine MSW (exclusive of CDD) disposed	753,562
Paper, cardboard, plastics and glass recycled - (voluntarily reported by materials processors and brokers)	183,557
Single Stream Recycling (not included above)	25,892
Other MSW recycled (computers and monitors, white goods, metals, tires, vehicle batteries, asphalt shingles, sheetrock, and textiles)	307,725
Reported MSW composted (includes leaf & yard waste, food scraps)	37,051
Subtotal Maine MSW recycled & composted	554,225
Total Maine MSW (exclusive of CDD)	1,307,787
Maine's MSW Recycling Rate (exclusive of CDD)	**42.38%**
Mixed CDD landfilled in state	289,497
Mixed CDD processed/disposed of out of-state	7,190
Landclearing debris landfilled	3,573
Beneficial use of processed CDD and landclearing debris	137,873
Total CDD and landclearing debris	438,133
Maine's CDD & Landclearing Debris Recycling Rate	**31.5%**
Total MSW, CDD & landclearing debris	1,745,920
Total MSW, CDD and landclearing debris recycled (including wood waste used as fuel chips)	692,098
Maine's Combined MSW, CDD & Landclearing Debris Recycling Rate	**39.6%**

C. Additional Waste Diversion

Maine generated more than 800,000 tons of wastes other than MSW and CDD in 2012. **One third of this material was diverted from disposal to composting, agronomic utilization or other beneficial uses.** Examining the various types of materials and the amounts utilized or disposed of as shown in Table 4 may provide insights into additional opportunities to increase diversion of some of these materials from disposal.

Table 4 - 2012 Disposition of Maine Solid Wastes other than MSW & CDD

Waste type	Beneficial use	Compost /N-Viro[2]	Land applied	Exported from Maine	Landfilled	Total
Asbestos/Asbestos Containing Waste	0	0	0	0	3,415	**3,415**
Ash - Boiler	2,912	0	0	0	123,843	**126,755**
Ash - Coal, oil and multifuel boiler	4,660	3,731	11,727	5,594	6,233	**31,945**
Ash - MSW Incinerator	0	0	0	0	121,213	**121,213**
Ash - Wood	40,807	0	0	0	352	**41,159**
Ash- Burn pile/hot loads	0	0	0	0	2,332	**2,332**
Ash/Liming Agent - Other	0	0	15,606	0	0	**15,606**
Catch basin grit and street sweepings	1,570	0	0	0	4,602	**6,172**
Contaminated Soils - non-petroleum	0	0	0	0	5,504	**5,504**
Contaminated soils - Oil	UD	0	UD	0	2,873	**2,873**
Dredge Spoils	7,390	0	0	0	55	**7,445**
Fish/Food Process Residue	0	2,840	38,232	581	0	**41,653**
Industrial/Industrial Process Waste	0	0	0	0	44,554	**44,554**
Other Special Wastes	0	0	0	9	15,403	**15,412**
Pulp/Papermill Sludge	20,162	4,202	0	0	38,973	**63,337**
Sandblast Grit	0	0	0	0	367	**367**
Short-Paper Fiber	29,789	0	0	0	4,884	**34,673**
Shredder Residue	0	0	0	4,871	32,103	**36,974**
WWTP Sludge - industrial	0	0	39	0	96,746	**96,784**
WWTP Sludge - municipal	0	79,068	10,655	0	40,310	**130,033**
Total	**107,290**	**89,841**	**76,258**	**11,055**	**543,760**	**828,184**

[2] N-Viro Soil is a trademarked product

Table 4 does not include all materials that could have become wastes, since many materials never enter the waste stream (e.g. recycled asphalt pavement). The 2012 data for the use of these materials, and some shown in Table 4, are compiled from a variety of sources and remain under development (UD) at the time of this report issuance.

Recent developments in conversion technologies that process organic wastes to create fuels are creating new opportunities to significantly increase the diversion of additional solid wastes from disposal in Maine. Appendix D describes these technologies and the types of materials they may use.

V. Plan for State Action to Move toward Sustainable Materials Management – 2014 - 2018

The priorities for Maine DEP's work on sustainable materials management for the next 5 years are to:

- Encourage the development of new infrastructure for separation from the waste stream and utilization of organics, including composting and technologies such as anaerobic digestion.
- Encourage increased beneficial use and recycling of materials, including identification of incentives and removal of unnecessary barriers.
- Provide tools and assistance to municipalities and businesses to support waste reduction and diversion efforts.
- Continue refinement of data sources and data management systems to more accurately and consistently assess progress toward statewide reduction and recycling goals, and to evaluate the effectiveness of programs and strategies.

The following strategies and actions are identified as ways for the State to focus its resources on the priorities identified as achievable and likely to have the greatest impact in improving waste reduction and diversion in Maine during the next five years.

A. Strategies and Actions to Promote Organics Management and New Technologies

- Provide technical and regulatory assistance to support development of regional and/or co-located processing facilities, including collection, sorting, composting, and biological and chemical conversion technologies.
- Develop solid waste management regulations specific to the licensing and operation of conversion technologies.
- Provide technical and regulatory assistance to support development of local food scrap composting operations, including on-farm operations and expansion of leaf and yard

waste facilities to include food scraps. Engage agricultural community to identify and address needs to increase participation in food scrap composting.

- Assist food scrap generators to identify and work with facilities that offer alternatives to disposal, such as compost facilities and anaerobic digesters.
- Develop outreach and education strategy to assist food scrap generators with separation programs.
- Develop case studies of successful organics separation and management operations, highlighting strategies for addressing potential issues such as odors, staff training, and additional resource needs.

B. Strategies and Actions to Increase Beneficial Use and Recycling

- Update recycling promotional campaign materials, develop additional materials for other diversion strategies, and maintain online.
- Coordinate with other Northeast States to develop regional approaches to support the development of recycling options for discarded mattresses and carpet.
- Identify and remove unnecessary barriers to the use of CDD wood as fuel, including review of waste characterization protocols.
- Explore opportunities to provide incentives for the use of municipally-generated CDD wood as biomass fuel.
- Update non-hazardous waste transporter regulations to reduce/remove requirements that no longer significantly improve environmental outcomes.
- Evaluate collection strategies for single-use (primary) batteries, antifreeze, and small gas cylinders, or other difficult to dispose of products.

C. Strategies and Actions to Support Municipalities and Businesses

- Develop and distribute waste diversion measurement tool for municipalities.
- Identify measurement tools for municipal and business entities to evaluate the environmental impacts of materials management systems, including greenhouse gas emissions.
- Continue program activities related to education, collection and proper disposal of unwanted pharmaceuticals and medical sharps
- Provide assistance to municipalities and businesses to improve collection and recycling of electronic wastes, mercury containing products, and architectural paint.
- Update and distribute building deconstruction guidance.
- Provide for positive public recognition of entities including municipalities, regions, and businesses that have made changes in their processes and systems that result in significant diversion of materials from disposal.

D. Strategies and Actions to Provide Reliable Data to Support Sustainable Materials Management

- Collect, utilize and disseminate reliable data to calculate statewide recycling and diversion rates for MSW and other solid wastes:
    - Develop and implement standardized data collection and management procedures and requirements for reporting of marketed recyclables by materials processors and brokers.
    - Develop and publish annual waste generation, diversion and disposal rates for industrial wastes.
    - Continue to develop and publish annual waste generation rates for MSW, including CDD.
- Assist municipalities in tracking of municipal recycling rates by developing and distributing a model methodology to calculate municipal generation, diversion and disposal rates for MSW.
- Collect, utilize and disseminate reliable data on annual waste diversion through beneficial use, agronomic utilization, anaerobic digestion, and waste conversion practices.

VI. Conclusion

Many opportunities remain in Maine to further divert materials from disposal. Organic materials such as food scraps can be separated from the waste stream and composted or processed by conversion technologies such as anaerobic digesters. Other types of conversion technologies can process a variety of materials to produce synthetic gas or liquid fuel. Additionally, improvements in data quality can assist the Department, municipalities and regions to better evaluate the performance and effectiveness of waste management and diversion programs in Maine.

The Department has identified a number of strategies to increase diversion rates, reduce disposal volumes, and to further utilize materials in Maine. The Department will evaluate and implement programs to encourage food scrap separation by industrial, commercial and institutional entities. The Department will also revise its regulations to clarify and specify licensing requirements for facilities utilizing conversion technologies. The Department recommends that facilities currently producing large volumes of or managing waste materials explore opportunities to establish co-located conversion technologies to achieve the greatest efficiencies through fuel generation and minimization of transportation costs.

These strategies can provide domestic, renewable energy sources, contribute to local economies, reduce greenhouse gas emissions, and extend the lifespan of Maine's existing landfill capacity.

Appendices

Appendix A – 5-Year Plan Advisory Committee

John	Adelman	CPRC, Scarborough
Ed	Barrett	City of Lewiston
Pete	Didisheim	Natural Resources Council of Maine
Mark	Draper	Tri Community Landfill, Caribou
Bob	Duchesne	Consultant to USA Energy Group, LLC
Richard	Geisser	ReEnergy
Victor	Horton	Maine Resource Recovery Association
Jared	Jacobs	One Steel
Joe	Kazar	Mid Maine Waste Action Corporation
Lee	Liner	Bath Public Works
Greg	Lounder	Municipal Review Committee
Jeff	McGown	Waste Management, Crossroads Landfill
Beth	Milligan	TOMRA (Returnable Services)
Troy	Moon	City of Portland
John	O'Connell	Lincoln County
Brian	Oliver	Casella Waste
Mac	Richardson	LAWPCA
Kevin	Roche	ecomaine
Ron	Slater	Sandy River Recycling Association
Dave	St Laurent	City of Rockland
Roberta	Scruggs	Maine Forest Products Council
Sarah	Wintle	Exeter Agri-Energy

Beneficial use of waste (38 MRS §2132 (3)). The use of waste paper, waste plastics, waste wood, including wood from demolition debris, used motor vehicle tires or corrugated cardboard as a fuel in industrial boilers or waste-to-energy facilities for the generation of heat, steam or electricity constitutes recycling only for the purposes of determining whether the goals in subsection 1 are met and for determining municipal progress as provided in section 2133. In order for the use of waste under this subsection to constitute recycling, the department must determine that there is no reasonably available market in the State for recycling that waste and the wastes must be incinerated as a substitute for, or supplement to, fossil or biomass fuels incinerated in the industrial boiler or waste-to-energy facility.

Municipal solid waste (06-096 CMR 400 (NNNN)). "Municipal solid waste" means solid waste emanating from household and normal commercial sources. Municipal solid waste includes front end process residue from the processing of municipal solid waste.

Recycle (38 MRS §1302-C (21)). "Recycle" means to recover, separate, collect and reprocess waste materials for sale or reuse other than use as a fuel for the generation of heat, steam or electricity.

Recycling (38 MRS §1302-C (22)). Recycling. "Recycling" means the collection, separation, recovery and sale or reuse of materials that would otherwise be disposed of or processed as waste or the mechanized separation of waste, other than through combustion, and the creation and recovery of reusable materials other than as a fuel for the generation of electricity.

Solid waste (38 MRS §1302-C (29)). "Solid waste" means useless, unwanted or discarded solid material with insufficient liquid content to be free-flowing, including, but not limited to, rubbish, garbage, refuse-derived fuel, scrap materials, junk, refuse, inert fill material and landscape refuse, but does not include hazardous waste, biomedical waste, septage or agricultural wastes. The fact that a solid waste or constituent of the waste may have value or other use or may be sold or exchanged does not exclude it from this definition.

Solid waste facility (38 MRS §1303-C (31)). "Solid waste facility" means a waste facility used for the handling of solid waste, except that the following facilities are not included:

A. A waste facility that employs controlled combustion to dispose of waste generated exclusively by an institutional, commercial or industrial establishment that owns the facility;

B. Lime kilns; wood chip, bark and hogged fuel boilers; kraft recovery boilers and sulfite process recovery boilers, which combust solid waste generated exclusively at the facility; and [

C. An industrial boiler that combusts mixed paper, corrugated cardboard or office paper to generate heat, steam or electricity if:

(1) The mixed paper, corrugated cardboard or office paper would otherwise be placed in a landfill;

(2) The market value of the mixed paper, corrugated cardboard or office paper as a raw material for the manufacture of a product with recycled content is less than its value to the facility owner as a fuel supplement;

(3) The mixed paper, corrugated cardboard or office paper is combusted as a substitute for, or supplement to, fossil or biomass fuels that constitute the primary fuels combusted in the industrial boiler; and

(4) The boiler combusts no other forms of solid waste except as provided in this subsection.

Special waste (38 MRS §1303-C (34)). "Special waste" means any solid waste generated by sources other than domestic and typical commercial establishments that exists in such an unusual quantity or in such a chemical or physical state, or any combination thereof, that may disrupt or impair effective waste management or threaten the public health, human safety or the environment and requires special handling, transportation and disposal procedures. Special waste includes, but is not limited to:

A. Oil, coal, wood and multifuel boiler and incinerator ash;
B. Industrial and industrial process waste;
C. Waste water treatment plant sludge, paper mill sludge and other sludge waste;
D. Debris and residuals from nonhazardous chemical spills and cleanup of those spills;
E. Contaminated soils and dredge spoils;
F. Asbestos and asbestos-containing waste;
G. Sand blast grit and nonliquid paint waste;
H. (repealed)
I. High and low pH waste;
J. Spent filter media and residue; and
K. Other waste designated by the board, by rule.

Appendix C - Current Management of Maine's Solid Waste by Type

Waste categories & types	Source reduction	Reuse and re-purpose	Recycle	Compost	Beneficial Use			Processing		Disposal	
					Agronomic Utilization	Raw material substitution	Fuel Substitution	Anaerobic Digestion	Conversion (gasification /pyrolysis)	WTE incineration	Landfill
	Note: N = None, I = Incidental, L = Low, M = Medium, H = High, gray shaded = Not applicable (not possible)										
MSW											
Organics											
Food waste	L	L		L				L	N	H	H
Leaves & grass	I	L		M					N	L	M
Prunings & trimmings	I	L		M			L		N	L	M
Other organics	N			N				N	N	H	H
Paper											
Corrugated cardboard (OCC)	L	L	M	L					N	M	M
Newspapers (ONP)	M	M	M	L					N	M	M
Magazines/catalogs	L	L	M						N	M	M
High grade office paper	L	L	M	L					N	M	M
Mixed paper	L	I	M						N	H	H
Plastics											
#1 PETE/PET	M	I	H			N	L		N	L	L
#2 HDPE	L	I	H			N	L		N	L	L
#3 PVC	L	I	M			N			N	M	M
#4 LDPE	L	I	M			N	L		N	M	M
#5 polypropylene	L	I	M			N	L		N	M	M
#6 polystyrene (Styrofoam)	L	I	M			N	L		N	M	M
#7 miscellaneous plastics	L	I	M			N	L		N	M	M

Appendix C - Current Management of Maine's Solid Waste by Type

Waste categories & types	Source reduction	Reuse and re-purpose	Recycle	Compost	Beneficial Use			Processing		Disposal	
					Agronomic Utilization	Raw material substitution	Fuel Substitution	Anaerobic Digestion	Conversion (gasification /pyrolysis)	WTE incineration	Landfill
plastic films	N	I	L			N	L		N	H	H
large rigid plastics	N	L	L			N	L		N	H	H
Metals											
Aluminum cans/foil	M	I	H							L	L
Steel Cans	L	I	M							M	M
Metals - ferrous	N	I	H							L	L
Metals - non-ferrous	N	I	H							L	L
Glass											
Brown/amber glass	I	L	H			L				L	L
Clear glass	I	I	H			L				L	L
Green glass	I	I	H			L				L	L
Consumer products											
Pesticides & fertilizers	I									H	H
Rechargeable batteries			L							H	H
Primary batteries	I		I							H	H
Paint	I	L	I							H	H
mercury-added thermostats	H	I	L							H	H
Mercury-added lamps	I		L							M	M
mercury devices	I		L							M	M
	Source	**Reuse**	**Recycle**	**Compost**	**Beneficial Use**			**Processing**		**Disposal**	

Appendix C - Current Management of Maine's Solid Waste by Type

Waste categories & types	reduction	and re-purpose			Agronomic Utilization	Raw material substitution	Fuel Substitution	Anaerobic Digestion	Conversion (gasification /pyrolysis)	WTE incineration	Landfill
small appliances	I		I							H	H
cell phones & other hand-held electronics	I	I	L							H	H
TVs & computer-related equipment	I	M	H							I	I
other consumer electronics	I	M	L							H	H
Vehicle Batteries			H							N	I
Tires		M	I			M	H		N	I	I
Unused medications	L	I		N					N	H	M
Sharps			N						N	H	H
textiles		L	L				N		N	M	M
mercury auto switches	H		M							M	I
CDD/wood waste/OBW											
Mixed CDD			L						N	I	H
Metal			H							I	L
Clean C&D wood			N			N	M		N	I	M
Coated/contaminated C&D wood						N			N	I	H
Treated wood						N	L		N	I	H
Asphalt roofing material			N			M	N		N	I	M
Wallboard			L		L	N				I	H
Carpet	L	I	L				N		N	I	H

Waste categories	Source reduction	Reuse and re-	Recycle	Compost	Beneficial Use			Processing		Disposal	
					Agronomic	Raw	Fuel	Anaerobic	Conversion	WTE	Landfill

Appendix C - Current Management of Maine's Solid Waste by Type

& types		purpose			Utilization	material substitution	Substitution	Digestion	(gasification /pyrolysis)	incineration	
Furniture & mattresses		L	L						N	L	H
Electrical			I							L	H
Asbestos -containing materials										I	H
Asphalt			H								L
White goods		I	H								I
Landclearing debris					L	N	L		N		L
PVC pipe and siding	N		I						?		H
Special wastes											
WWTP sludge				H	L		L	L	N		L
industrial process wastes					L	N	N		N		H
food processing waste				M				L	N		M
Shredder residues						?			N		H
Multi-fuel boiler ash						N					H
Wood ash					M	N					M
Coal ash						N					H
MSW ash											H
Burn pile ash											H
Contaminated soils						N					H
Dredge materials						M					M
Sandblast grit						N					H
Catch basin grit & street sweepings						N					H

There are three broad categories of waste conversion technologies: 1) thermochemical, such as gasification, pyrolysis, and plasma arc technology; 2) physiochemical, such as distillation of ethanol and the production of biodiesel; and 3) biochemical, such as anaerobic digestion and ethanol fermentation and hydrolysis. Potential benefits of these technologies include lower greenhouse gas and other air emissions, renewable energy production, offset of fossil fuels, and beneficial use of waste materials.

Four technologies are briefly discussed here because they are new and have relevance for Maine and large-scale applications for waste management.

1. Gasification

Gasification is a term that describes a chemical process by which carbonaceous (hydrocarbon) materials (coal, petroleum coke, biomass, etc.) are converted to a synthesis gas (syngas) by means of partial oxidation with air, oxygen, and/or steam.

A hydrocarbon feedstock is fed into a high-pressure, high-temperature chemical reactor (gasifier) containing steam and a limited amount of oxygen. Under these "reducing" conditions, the chemical bonds in the feedstock are severed by the extreme heat and pressure and a syngas is formed. This syngas is primarily a mixture of hydrogen and carbon monoxide. The syngas is then cleansed using systems that remove particulates, sulfur, and trace metals. The resulting gas mixture is a fuel.

Gasification is potentially a very efficient method for extracting energy from many different types of carbon-containing materials. More of the energy contained in the materials is extracted by gasification than direct combustion of the original fuel, such as occurs in the current waste-to-energy technologies employed in Maine. In addition, the high-temperature process refines out corrosive ash elements allowing cleaner gas production from otherwise problematic fuels, and produces lower emissions of greenhouse gases than waste-to-energy systems.

2. Plasma Arc Technology

Plasma arc gasification as a waste treatment technology uses high electrical energy and high temperature created by an electrical arc gasifier to break down the waste primarily into elemental gas and a solid waste slag. The process is intended to be a net generator of electricity, depending upon the composition of wastes, and also to reduce the volumes of waste being sent to landfill sites.

A different type of plasma arc waste conversion that uses plasma to refine gases produced during waste conversion, rather than to destroy waste, has recently been shown to be successful on a full commercial test scale in Ontario. Its emissions are lower than other thermal waste processing systems, and by converting waste to CO_2 and water, rather than to methane, the greenhouse gas emissions are much less than those from competing technologies.

There are a number of large scale plasma projects proposed to come on line over the next several years including proposals in Ottawa, Ontario, St. Lucie County, Florida and the City of Tallahassee, Florida.

3. Biochemical – Anaerobic digestion

Anaerobic digestion is a process where microorganisms break down organic materials, such as manure, sewage sludge and food scraps, in the absence of oxygen. This decomposition process produces biogas, made primarily of methane and carbon dioxide, which is captured and combusted to produce electrical energy and heat. The digestion process also produces a liquid digestate that can be used as a soil amendment, and a solid digestate that can be utilized as a bedding material for livestock, composted or applied to crop land to enrich the soil.

Anaerobic digesters may utilize animal manure or sewage sludge as its primarily organic feedstock, with food scraps added as another organic feedstock, or food can be digested at facilities specifically designed for the organic portion of municipal solid waste. Co-digestion is a process whereby additional, energy-rich organic materials (e.g. food scraps or fats, oils, and grease) are added to dairy or wastewater digesters that have excess processing capacity.

There are currently several anaerobic digesters in operation in Maine, using either animal manures or sewage sludge as the primary organic material, with other facilities in planning or discussion phase.

4. Landfill Gas

Landfills can be actively managed for their gas recovery potential. The gas can be used to fuel generators to produce electricity, piped to other fuel combustion facilities, or compressed and bottled. The gas is collected by placing pipes in the landfill, and maintaining slight pressure sufficient to draw the gas into a recovery plant but not enough to draw oxygen in through the landfill cap. The gas is then cleaned and either piped to a generator plant, a local application, or a compressor plant.

There are currently two landfills in Maine capturing landfill gas and combusting it in on-site facilities to generate electrical power for the grid: the closed former Pine Tree Landfill in Hampden (owned by Casella Waste Services) and the currently active Crossroads Landfill in Norridgewock (owned by Waste Management Inc.) The state owned landfill in Old Town, Juniper Ridge, is currently flaring its landfill gas, but discussions are underway to beneficially capture and utilize that gas through an agreement with the University of Maine at Orono.

Federal EPA Overview Conversion Technologies

Table ES-1. Overview of Conversion Technology Characteristics.[1]

Conversion Technologies	Pyrolysis	Gasification	Anaerobic Digestion
Feedstock	Plastics	MSW[2]	Food, yard, and paper wastes
Primary End Product(s)	Synthetic Oil, Petroleum Wax	Syngas, Electricity, Ethanol	Biogas, Electricity
Conversion Efficiency[1]	62–85%	69–82%	60–75%
Facility Size (Capacity)	10–30 tons per day	75–330[3] tons per day	10–100[5] tons per day
Product Energy Value	15,000–19,050 BTU/lb	11,500[4]-18,800 BTU/lb	6,000–7,000[5] BTU/lb

1 Conversion efficiency is defined as the percentage of feedstock energy value (e.g., btu/lb) that is transformed to and contained in the end product (e.g., syngas, oil, biogas).

2 Only certain MSW fractions can be input to a gasifier. Glass, metals, aggregate, and other inerts are not desirable and may cause damage to the reactor.

3 Total capacity permitted based on vendor communications. Geoplasma's St. Lucie, FL plasma gasification plant is permitted up to 686 tons/day, but the vendor could not be reached for confirmation. [Note: as of September 2012, the St. Lucie facility is no longer in development]

4 LHV of ethanol

5 Estimated. AD facilities can span a wide range of sizes, input feedstocks, and designs.

U.S. Environmental Protection Agency's October 2012 report, "State of Practice for Emerging Waste Conversion Technologies" (http://nepis.epa.gov/Adobe/PDF/P100FBUS.pdf)

While the application of these technologies to municipal solid waste (MSW) feedstocks is only emerging in the United States (U.S.), these technologies have been applied for the management of MSW in other parts of the world, such as Australia, Canada, Europe, and Japan. A key aspect of international applications is that they are part of waste systems with advanced segregation, such as source segregated organics collection. Where conversion technologies have been most successful is in locations with already established programs for waste segregation and collection, dedicated waste streams (e.g., plastic from industrial partners), and waste supply contracts so that potential plants can operate economically.

Table 5 - Available Licensed MSW Disposal Capacity in Maine

Waste-to-Energy Facilities	***Annual capacity***	**2012 (tons/year)**	**2017 (tons/year)**	**2022 (tons/year)**	**2032 (tons/year)**
MMWAC – Auburn	70,000	70,000	70,000	70,000	70,000
ecomaine – Portland	170,000	170,000	170,000	170,000	170,000
PERC – Orrington	304,000	304,000	304,000	304,000	304,000
MERC	310,000	310,000	0	0	0
Total incinerator capacity in tons	**854,000**	**854,000**	**544,000**	**544,000**	**544,000**
	2012 Fill rate (cubic yards)	**2012 (cubic yards)**	**2017 (cubic yards)**	**2022 (cubic yards)**	**2032 (cubic yards)**
State-owned landfills:					
Carpenter Ridge – T 2 R 8	N/A	Not developed	Not developed	Not developed	Not developed
Juniper Ridge – Old Town	586,775	5,280,000	2,346,125	0	0
Municipal MSW landfills					
Augusta - Hatch Hill	49,718	961,488	712,898	464,308	0
Bath	23,000	340,000	225,000	110,000	0
Brunswick	9,943	227,337	177,622	127,907	28,477
Presque Isle	19,240	1,455,091	1,358,891	1,262,691	1,070,291
Tri-Community	25,204	1,677,653	1,551,633	1,425,613	1,173,573
Municipal 'ash' landfills					
ecomaine	22,174	772,602	661,732	550,862	329,122
Lewiston	17,559	608,370	520,575	432,780	257,190
Commercial landfills					
WM Crossroads - Norridgewock	255,873	3,910,662	2,631,297	1,351,932	0
Total landfill capacity in cubic yards	1,009,486	15,233,203	10,185,773	5,726,093	2,858,653
Total disposal capacity	**1,553,486**	**15,777,203**	**10,729,773**	**6,270,093**	**3,402,653**

1 cubic yd MSW = 625 lbs.

TABLE 6 - LANDFILLED TONNAGES AND REMAINING LANDFILL CAPACITIES – 2012									
Landfill	**MSW (tons)**	**CDD (tons)**	**Special Wastes (tons)**	**Other Materials and Descriptions**		**Capacity Consumed in 2012 (cubic yards)**		**Constructed Capacity Remaining (cubic yards)**	**Licensed Capacity Remaining (cubic yards)**	**Years of Licensed Capacity Remaining at current fill rate**
Augusta - Hatch Hill	27,570	(included in MSW)	3,514	13,532 yds^3 of cover materials		49,718		961,488	961,488	17.5
Bath	11,920	1,232	718	25,309 yds^3 of cover materials		23,000		126,000	340,000	14.8
Brunswick	3,346	(included in MSW)	0			9,943		227,337	227,337	22.9
Presque Isle	7,489	1,225	1,881	2,014 yds^3 of cover materials		19,240		265,091	1,455,091	53
Tri-Community	24,979	1,099	1,405	5330 tons of bark mulch as cover materials		25,204		577,653	1,677,653	66.6
ecomaine	0	0	49,838	Excavated 3,987 tons MSW to combust, and 8,254 tons of metal for recycling		22,174		194,240	772,602	34.8
Lewiston	0	724	17,654			17,559 (5 year average)		608,370	608,370	35
Waste Management / Crossroads	68,307	73,780	97,199	Also received 142 tons of clean dirt utilized as ADC; also, 76,250 tons of Special Waste were utilized as ADC		255,873		1,498,912	3,910,662	15.3
Juniper Ridge	94,907	369,069	173,158	Includes 235,546 tons of waste utilized as ADC; special waste includes 101,276 tons MSW incinerator ash		586,775		1,300,000	5,280,000	9.0
MidCoast Solid Waste	0	2,760	0			4,560		10,400	10,400	2.3
Rockland	0	16,553	3231			53,300		212,000	212,000	4.0
Totals	238,518	466,442	348,597	Overall total = 1,053,557						--

Table 7 - 2012 Waste Handling by Maine Waste-to-Energy Incinerators											
FACILITY	**Municipal MSW received**	**Commercial MSW received**	**Spot market MSW received**	**Other waste received**	**Total waste received**	**Waste shipped as bypass**	**Front end process residue produced**	**Metals recovered**	**MSW combusted**	**Ash produced**	**MSW destroyed through combustion**
Maine Energy	51,944	178,674	0	9,498	240,116	1,883	37,453	5,068	186,214	45,363	140,851
Ecomaine	62,934	68,822	44,306	0	176,062	1,120	**0**	11,251	163,691	45,945	117,746
Mid Maine Waste Action Corp	36,995	14,014	22,639	0	73,648	11,479	**0**	1,902	60,267	17,421	42,846
Penobscot Energy Recovery Corp.	193,992	100,307	17,332	578	312,209	44	56,692	8,708	246,187	55,880	190,307
TOTALS	**345,865**	**361,817**	**84,277**	**10,076**	**802,035**	**14,526**	**94,145**	**26,929**	**656,359**	**164,609**	**491,750**
	Total MSW received = 791,959				*percent of total*	*1.81%*	*11.74%*	*3.36%*	*81.84%*	*20.52%*	*61.31%*

All amounts are in TONS

Other waste includes wood chips and special wastes - assume 100% destroyed through incineration

Bypass includes non-processible and bulky waste

Ecomaine municipal MSW received was 63,743; 809 tons temporarily landfilled for recovery & burning as needed to operate boiler at maximum efficiency

Maine Energy FEPR amount includes 1007 tons of RDF used as absorbent for clean up

MSW combusted = Total waste received – (other waste received + waste shipped as bypass + FEPR produced + metals recovered)

Components of a municipal solid waste (MSW) management system include collection, transportation, facility operations, marketing of recyclables, and final disposal. 38 MRSA §1305 states that each municipality in Maine is responsible for providing for "solid waste disposal services for domestic and commercial solid waste generated within the municipality." This allows each municipality local control to determine the management system it will use to fulfill this responsibility, including how much of the system will be publically or privately owned and/or operated, and how the system is funded.

The overall cost of MSW management for a municipality and its residents is determined by the amount generated and disposed, the disposal fee, operational and transportation costs, and the cost of or revenue from recycled materials.

Collection

Options for collecting MSW from residences for transport to either a transfer station or disposal facility include: drop off (self-haul by residents), curbside collection by private haulers contracted by individual households, curbside collection by a private hauler(s) contracted by the municipality, and municipally-provided curbside collection. The latter two options result in much more efficient collection than the first two, which involve multiple vehicles engaged in overlapping trips with less waste transported for each mile travelled.

Municipalities that contract for or provide curbside collection can set operational requirements to realize the overall cost savings achieved by such efficiencies. Taking responsibility for collection of MSW from households also enables municipalities to transition to management strategies proven to decrease disposal rates and increase recycling and composting of organics. Such strategies include pay-as-you-throw for disposal, and more frequent collection of compostable organics and recyclables and less frequent collection of trash for disposal. Along with savings realized through transportation efficiencies, additional reductions in waste management costs can be realized where disposal tipping fees are greater than fees for the management of recyclables and compostable organics.

Transportation

Transportation costs can be consistently expressed as the dollar amount per ton per mile. As part of a recent regional solid waste management planning initiative, the MidCoast Economic Development District (MCEDD) determined that MSW transportation costs for 11 different facilities ranged from $2.36/ton/mile to $5.46/ton/mile, with smaller facilities having relatively higher costs.

Disposal

The management system costs determined by the final disposal location include disposal (tipping) fees and transportation costs.

Facilities offering in-state disposal and recent disposal fees include:

Disposal Site	Location	2012 MSW Disposal Fee
Bath Landfill	Bath	$75-$105/ton
Brunswick Landfill	Brunswick	$80/ton
Ecomaine Incinerator	Portland	$88-$110/ton
Hatch Hill Landfill	Augusta	$62-70/ton
MMWAC Incinerator	Auburn	$70-$83/ton
PERC Incinerator	Orrington	$51-$54/ton (after rebate)
Presque Isle Landfill	Presque Isle	$112-$150/ton
Tri-Community Landfill	Fort Fairfield	$85/ton
Crossroads Landfill	Norridgewock	$60/ton

Tipping fees change over time and may be dependent on the waste volume, type and whether the waste is residential or commercial. Towns that are on or near the state borders may want to consider disposal facilities outside the state. Out of state disposal facilities that are used by some Maine towns include: Cogerno Landfill, Rivière-Verte, NB; Southwest Landfill, Lawrence Station, NB; Mt. Carberry, Success, NH; and Waste Management's Turnkey Landfill, Rochester, NH.

Recycling

Recycling programs vary by municipality but contain similar components: separation, collection, processing and marketing. The generator of municipal solid waste makes a conscious decision to separate from their trash those materials and products that are accepted by the local recycling program. Once separated from the trash, the recyclables are provided to the recycling program, and that is where a significant difference can exist. For communities with curbside collection, many have switched from a program where residents placed separated recyclables at the curb to a 'single stream' program where all recyclables are placed curbside in a single container, a more efficient collection system, reducing collection costs and encouraging increased participation in the recycling program. These co-mingled recyclables are then transported to a materials recovery facility (MRF) where sorting of the recyclables occurs, and then the recyclables are processed and marketed. Many other communities still collect separated recyclables at the curb or accept them at their drop-off recycling center where the materials are processed and marketed.

The single-stream recycling programs greatly reduce the collection costs of recyclables but require capital intensive sorting systems. The costs for curbside collection are typically absorbed by the municipality, which then is responsible for delivering the recyclables to a MRF that it either is a part owner of or contracts for its use. Costs at a MRF are typically covered by the value of recyclables, but there is often a recyclable's value point achieved where a municipality may receive a portion of the value in return, or should the recyclable's value point decrease, the municipality may have to pay a fee for the processing and marketing of its recyclables. Actual MRF expenses vary by facility, but operationally, costs per ton of recyclable received and processed ranges from $55 to $75 per ton for the single stream recyclables, with that cost being covered by the value received from the sale of the products.

In a program where residents drop off their separated recyclables, recycling center staff process and market the recyclables. Little sorting of recyclables is necessary. The costs are primarily labor and equipment but the recycling program receives the value of the recyclables it processes. The costs for these programs vary as well, and may range from $40 to $90 per ton, or higher, depending upon the

size of the operation, the types and amounts of recyclables accepted, and equipment used for processing. The values received for recyclables vary [see excerpt from the Maine Resource Recovery Association (MMR) monthly markets report below], but in many cases reduce the net cost of managing the recycling program down towards zero. The differences here are that the collection costs are borne by the resident and the value of the recyclables is received by the municipality.

September 2013 MRRA Recycling Markets Report

Prices have continued to bounce around a narrow range with OCC up $10 the most significant change. Economic weakness continues and new uncertainty in the Middle East makes markets nervous. There does not appear to be any impetus to move prices higher at this time.

All prices are net to you and subject to changing market conditions.

	Sept '13	June-July '13
OCC	$115-120	$105-110
NEWS #8	$65	$65
Mixed Paper	$13-37	$35
SOW	$150	$140
HDPE #2 Natural	$674	$634
HDPE #2 Z (Mixed)	$304	$414
HDPE #2 Colored	$294	$354
Plastics #1,3-7 no #2	$0 to -$100	-$80 to -$100
PET #1 (full load of UBC quality)	$454	$534
Tin Cans (p/u - varies w/ freight)	$150	$157
Scrap Metal (p/u - varies w/ freight)	$70-145	$50-130
Tires (negative)	-$65	-$65
MRRA net avg. paid prior month (picked up)	$103	$107
ecomaine single stream (delivered)	-$10	$0

When comparing recycling options and value against the costs of disposal, communities may identify the tipping fee charged and not include the collection, consolidation and/or hauling fees in its disposal costs. Recycling programs are typically more closely monitored for costs, from collection to separation to processing, but the value of recyclables may be not included since that income often goes into the municipality's general fund, and not towards the recycling program.

Composting

Many Maine families utilize a back yard composting system for their organics, which may include leaf and yard trimmings as well as kitchen scraps. This type of system keeps organics out of the waste stream and creates a beneficial product for home use. Backyard composting is a very efficient way to manage organics and reduce dependency upon disposal options.

Over eighty municipalities provide a leaf and yard trimmings compost facility for their residents to utilize, as part of a larger program to reduce the amount of materials being discarded and at the same time generate a product that can be used by residents and the municipality. Leaf and yard trimmings programs are a low operational/maintenance program that can easily divert ten percent or more of the community's waste stream from disposal at a fairly low cost. Composting pads may be constructed of gravel, and the compost piles only need to be turned four times a year. Most programs turn the piles more frequently, which can result in more rapid decomposition of the materials and a better product. These types of composting programs can operate for $25 to $40 per ton and are often welcomed by residents. Most programs do not charge for the finished compost or may charge a nominal fee to assist with the program's costs. These programs support the diversion of waste while keeping the value of the compost product local.

Some municipal composting programs are beginning to accept food scraps from residents, institutions and businesses, which will further reduce the amount of organic residuals sent off for disposal. Composting operations utilizing food scraps require more attention, which may increase facility management costs, but can produce a higher quality compost for community participants. One of the challenges with accepting food scraps is the logistics of delivery of the food scraps from generators to the composting facility.

Since issuance of the previous State plan, several anaerobic digesters that process food scraps commenced operation in Maine. While the primary organic utilized in these digesters is manure, adding food scraps can have a positive effect on the unit's operation. There are logistical challenges with identifying food scrap generators and securing a hauler for delivering those scraps to the anaerobic digester, where they can be mixed with the manure to generate methane gas, which is then combusted to produce electricity.

Appendix G - Consolidation of ownership in the disposal, collection, recycling & hauling of solid waste

The Waste Generation and Disposal Capacity Report, for even-numbered years, is to include an analysis of consolidation in the ownership of the collection, recycling, hauling, and disposal sectors. This is performed to review Maine's solid waste industry for possible undue consolidation and the potential for unfavorable impacts on competition. The Department examines these industry sections to look for conditions that may either create a decrease in services or a monopolistic situation.

For 2012, Maine's solid waste industry was a mix of public and private investments and services that handled nearly 5,000 tons of materials each day. A review of that system and its components shows that the interrelated services of collection and hauling of recyclables and trash, and the processing or disposal of those materials, were provided in a consistent fashion, responding to Maine's solid waste management needs.

Disposal Facilities

During 2012, there was one change in the ownership/operation of a disposal facility, the Maine Energy Recovery Company (MERC), a waste-to-energy (WTE) incinerator. Located in Biddeford, MERC ceased operation the end of December under an agreement with the City of Biddeford. Subsequent to the previous review of consolidation in the waste management industry provided in the 2012 report, the Town of Greenville closed its landfill in 2011.

Collection and Hauling Services

During 2012, no substantial change in the ownership or operation of the many collection and hauling companies servicing residents, businesses, and municipalities was identified. There has been an increase in the 'partnering' or 'sharing of equipment/services' within the hauling sector, where one company contracts with another to provide collection, hauling or equipment services in the hiring company's stead. While these arrangements are typical, it will be an activity that the Department will monitor in the coming years, from the perspective of a potential shift in market share.

Recycling Services

In 2012, both processors and haulers continued promoting their offerings of the 'single stream' recycling collection strategy, also known as 'single sort' or 'Zero Sort®' services, where residents are able to place all of their recyclables into a single container for collection. This single container is then collected, delivered to a processing facility, and the material sorted into commodities and marketed. *Ecomaine*, a non-profit waste management company owned and operated by 21 municipalities in Southern Maine, established a single sort recycling program in 2007. FCR Goodman and Pine Tree Waste, divisions of Casella Waste Systems, Inc. offer a single stream recycling collection service through their program known as Zero Sort®. The collected recyclables are consolidated and shipped to either of the company's two processing facilities in Auburn, Massachusetts and Charleston, Massachusetts. As of this date, Casella is planning on constructing a recyclables processing facility in Lewiston.